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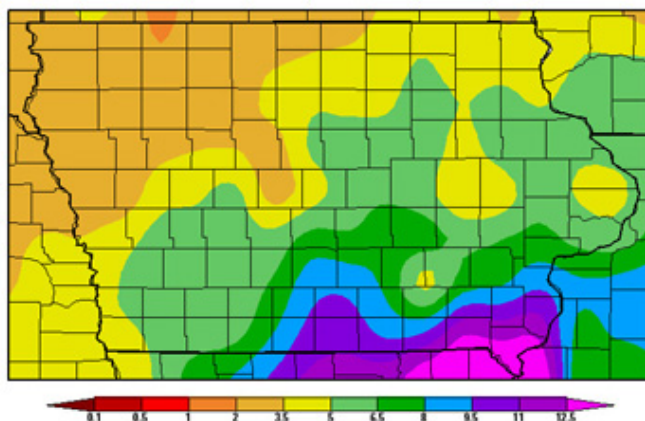
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Wet Soil Conditions and Nitrogen Loss

By John Sawyer, Department of Agronomy

South and southeast Iowa have experienced much above normal precipitation and continued wet soils early this spring. See the figures below for the precipitation and departure from normal for the April 18-May 17, 2010 period. What does this mean for nitrogen (N) loss, and is this a repeat of the last two years for that area of Iowa? While it has been wet, it has also been cooler than normal (see figure below). That is important because cool temperatures slow nitrification and denitrification, both biological processes important for potential N loss. While the wet period does not bode well for retaining N, it may not be a repeat of the last two years as those were continued wet late in the spring and into early summer. Time will tell if the wet conditions persist this year and promote N loss.

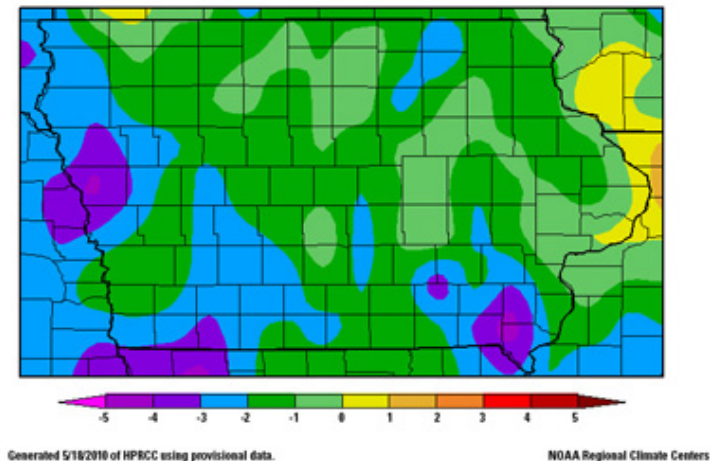
Precipitation (in)
4/18/2010 - 5/17/2010



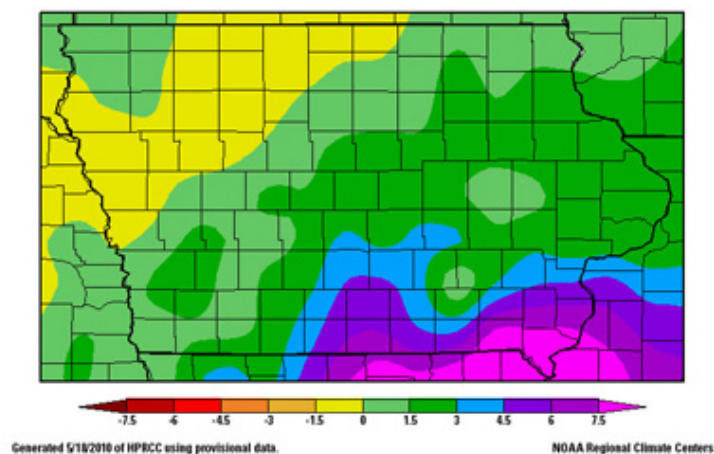
Generated 5/18/2010 of HPRCC using provisional data.

NOAA Regional Climate Centers

Departure from Normal Temperature (F)
4/18/2010 - 5/17/2010



Departure from Normal Precipitation (in)
4/18/2010 - 5/17/2010



Many soils in south-southeast Iowa have poor internal drainage. This means denitrification is a major N loss pathway with wet conditions. There are also areas of coarse-textured sandy soils with high internal drainage and high percolation rates. Those soils have leaching as the predominant loss pathway. In those soils, N in the nitrate form is easily leached with high rainfall events and fertilizer applied in the nitrate form or converted to nitrate could be lost already this spring. This is why split spring preplant or at planting N and sidedress application is an important management practice for those soils. That management can be helpful for poorly drained soils as well.

Nitrogen applications most at risk from the early spring wet conditions are early fall manure containing high percentage as ammonium (liquid swine manure), early fall DAP/MAP, early fall anhydrous ammonia, spring ammonium nitrate and spring urea-ammonium nitrate (UAN 28 or 32 percent) solutions. Why these applications? With early fall application comes the conversion to nitrate by early spring and with the spring application the materials already contain nitrate and faster nitrification. With the late harvest last fall, there was less fall N application than usual, which will help.

If the corn crop is severely damaged by excess water, application of N will not overcome that damage or lost yield potential. So, additional N would not be warranted. If you are concerned about N loss, and since the corn is still small,

make two or three strip applications of additional N across representative fields and watch the corn growth and color. If there is noticeable improvement, then additional N could be warranted. Give the corn plenty of time to recover and roots to grow into N that may be deeper in the rooting zone (due to nitrate movement downward). The strips and adjoining non-treated corn can be harvested and yield compared to see the yield response to the additional N application. The ISU Extension publication PM 2026, [Sensing Nitrogen Stress in Corn](#), describes methods to implement these N strips and a method to compare the corn N status with a handheld SPAD chlorophyll meter. Canopy sensors are also available that can be used to determine corn N status at mid-vegetative growth stages. For use of these sensors, there needs to be reference areas – corn that does not exhibit N stress (non-limiting N); hence strips applied now with additional N can be used for reference areas across fields.

For additional information on N conversion in soil and its relationship to N loss, see [Nitrogen Conversion in Soil Related to N Loss](#).

John Sawyer is a professor of agronomy with research and extension responsibilities in soil fertility and nutrient management.

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